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Configurations of Allergies, Depression, and Shyness in an Adult Population

by

Peta G. MacDonald ©

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Configurations of Allergies, Depression, and Shyness in an Adult Population submitted by Peta G. MacDonald in partial fulfilment of the requirements for the degree of Master of Education in Counselling Psychology.

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ABSTRACT

Configurations of allergies, depression, and shyness were investigated in an adult population attending university. Participants completed three questionnaires: the Social Reticence Scale, the Beck Depression Inventory and the Allergic Disorder Inventory.

The allergies asthma and hives were significantly positively correlated with levels of depression whereas allergies and shyness were not significantly correlated. Higher levels of shyness were positively correlated with higher levels of depression. The number of allergies was significantly positively correlated with current depression as well as with a history of depression. There was no significant relationship between the number of allergies or allergens and levels of shyness.

Although females reported more allergies than males, no significant difference was observed between males and females in levels of depression and shyness. Younger subjects reported a greater frequency of depression.

The severity of allergic symptoms was not significantly correlated with levels of depression and shyness.

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List of Abbreviations

ADI	Allergic Disorder inventory
BDI	Beck Depression Inventory
Ig	Immunoglobulin
IgA	Immunoglobulin A
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IgD	Immunoglobulin D
IgE	Immunoglobulin E
MMPI	Minnesota Multiphasic Personality Inventory
SRS	Social Reticence Scale

I. INTRODUCTION

Allergies, depression, and shyness have individually been the subject of psychological and medical research. Research investigating the combination of these variables, however, is both limited and controversial. For example, several researchers have investigated the relationship between allergies and depression. While some studies have reported an association between allergies and depression (e.g., Bell, Jasnoski, Kagan, & King, 1991), other research has suggested that affective disorders lack a definitive association to the severity and duration of allergic disorders (e.g., Teiramma, 1978a, 1978b), or that the relationship between allergic disorder and depression holds only for females (e.g., Matussek, Agerer, & Seibt, 1983). Similarly, the relationship between shyness and allergic disorder has been studied, although not extensively. A few studies have linked allergic rhinitis with shyness (e.g., Bell, Jasnoski, Kagan, & King, 1990; Bell et al., 1993) or severe asthma with introversion (Teiramma, 1978b).

Allergies are a common somatic response to the biological and chemical environment. It has been suggested that biological, chemical, and physical environments may be as significant as the social and psychological environments of the individual (Simon, Katon, & Sparks, 1990). For example, King (1980) reported double-blind provocation of cognitive-emotional symptoms by a variety of allergens and

concluded that environmental allergens may contribute to psychological dysfunction in some individuals.

Since it has been suggested that the constituents of the environment interact with intrinsic traits and/or susceptibilities to regulate normal and pathological aspects of behaviour (Bell, 1992), it would be useful to investigate the presence of allergies in individuals vulnerable to depression and shyness. Moreover, because it has been estimated that allergies may occur in more than 20% of the population (Gauci, King, Saxarra, Tulloch, & Husband, 1993), research exploring the possible relationship between allergies, depression, and shyness is a worthwhile endeavour.

According to the diagnostic and statistical manual of mental disorders (American Psychiatric Association, 1994), depression is a negative affective state characterised by loss of interest or pleasure in activities, irritable mood, fatigue, diminished ability to concentrate, insomnia or hypersomnia, weight gain or loss, and agitation. The implications of depression are enormous, often resulting in suicide. It is estimated that 8-10% of the population will experience a severe depressive episode at some time in their lives of which an estimated 63% will exhibit recurrent episodes (Carson, Butcher, & Coleman, 1988). Given the prevalence and debilitative nature of depression it is a personality construct worthy of additional research. A clearer understanding of depression may allow for

interventions aimed at specific groups that may possibly limit the severity and/or duration of the depressive episodes.

Shyness is a condition of discomfort, embarrassment, and inhibition in the presence of others. It is a form of social anxiety that frequently interferes with an individual's ability to relate and function effectively with others in social situations. Other characteristics of shyness include reticence, lack of confidence and an excessive preoccupation with self in the presence of others (Jones & Russell, 1982).

Trait shyness is an inherited psychobiological pattern that is evident in early childhood and is one of the few behaviourial characteristics that is relatively stable over time and is unrelated to social class and intelligence (Kagan, Reznick, & Snidman, 1988). Asendorpf (1992) assessed the continuity of shyness between pre-school age and adulthood and found evidence of stability over time. In children, shyness is typically characterised by fearfulness and withdrawal in unfamiliar situations. This behaviour is evident as early as 21 months of age and may be present at birth (Kagan, Snidman, Julia-Sellers, & Johnson, 1991). Bell et al. (1993) also reported that shyness was a stable temperament and added that it seemed to be associated with less formal education.

During the last twenty years, increases in divorce rates, geographical relocation, "blended" families, and

continually changing social roles have resulted in individuals forming relationships without the advantage of traditional social and family ties (Jones & Briggs, 1986). Consequently, it has become necessary to investigate and understand personality characteristics that may possibly lead to lack of achievement, potential, or fulfilment so that they may be treated accordingly. Moreover, given that there may be an association among allergies and depression and shyness and depression, it seems reasonable to speculate that social phobias may be extreme forms of shyness that may be exacerbated in part by the interaction of depression and/or allergies. Since a possible association of the role of shyness in the etiology of depression has already been considered (e.g., Johnson, Petzel, & Johnson, 1991), a better understanding of the nature of shyness will permit intervention that may contribute to the emotional well-being of the individual. As it has been estimated that shyness occurs in approximately 40% of young adults (Zimbardo, 1977) it is a personality construct deserving of investigation.

The interaction among the variables allergies, depression, and shyness and their effect on the functioning individual is not well understood. It could be that shyness and/or depression are biologically based, sharing a common pathway with allergic responses. Nasr and Atkins (1977) observed coincidental improvement in patients with concurrent asthma and manic-depression who were taking lithium carbonate

(a pharmacological agent). Concurrent improvement in both allergic and affective disorders may suggest a shared biological basis for both disorders. Similarly, an association among the presence of allergies, depression, and shyness could indicate a hyperresponsivity of the immune system to the external environment that may be a cause, a result, or a concomitant of the psychological dysfunction (Bell, 1992). Examination of allergic individuals' vulnerability to shyness and depression can possibly help identify other individuals at risk for depression and shyness before clinical states emerge. By better understanding the relationship among allergies, depression, and shyness, counsellors and physicians may, by identifying one concern of the individual, understand how it relates to the other variables and give that area necessary attention.

Allergies, depression, and shyness are important variables in the emotional and physical well-being of the individual. While associations between pairs of these variables have been made, little research has focused on all three variables in the same study. As research focusing on these variables is limited and in the preliminary stage, additional studies will serve as a check on previous findings, which if supported, may initiate further research in the areas of prevention and treatment in both psychology and medicine. In addition, investigation of the influences of age and gender on allergies, depression, and shyness as well

as the number, severity, and age of onset of allergies may assist in identifying certain groups at risk.

II. REVIEW OF THE LITERATURE

Allergies, depression and shyness are important constructs in the well-being of the individual. Having previously described and defined the variables allergies, depression and shyness, this section attempts to further describe these constructs as well as to integrate the relationships among these three variables. First, allergies, depression, and shyness are individually described. This is followed by a review investigating the associations between pairs of these variables. Finally, a section which reviews all three variables concurrently is presented.

Allergies and the Allergic Reaction

Allergic reactions are chronic immunological responses to one or many types of environmental stimulants. Examples of environmental stimulants include heat, cold, pollen, dust, mould, foods, and chemicals and are commonly referred to as allergens. Allergens are any substances that are capable of causing allergic manifestations. According to Taber's cyclopedic medical dictionary (1982), common classes of allergens include inhalants (e.g., pollen, dust, and moulds) food (e.g., wheat, eggs, and strawberries), drugs (e.g.; antibiotics and aspirin), infectious agents (e.g., bacteria and viruses), contactants (e.g., metal, plastic, and chemicals), and physical agents (e.g., temperature, light,

and pressure).

Allergens may or may not be antigens. Antigens are chemical substances that when introduced to or formulated within the body stimulate the formation of antibodies (Tortora & Anagostakos, 1981). An antibody is a protein structure produced by lymphocytic B cells (a type of white blood cell) that is capable of combining with a specific type of antigen with a configuration analogous to a lock and key. This antigen-antibody reaction is the basis for immunity and provides resistance against disease. Antibodies belong to a group of proteins called globulins and are known as immunoglobulins or Ig. There are five types of immunoglobulins: IgG; IgA; IgM; IgD; IgE (Tortora & Anagnostakos).

According to Tortora and Anagnostakos (1981), there are two stages necessary for an allergic reaction to occur. In the first stage, the allergen enters the body and antibodies (immunoglobulins) are produced against this specific allergen. At this time no allergic reaction occurs. In the second stage, the allergen enters the body a second time and an allergic reaction results. During this stage, the antibodies formed against the first exposure to the allergen remain attached to the B cell lymphocytes and the cells are said to be sensitised. When the allergens are introduced to the body a second time, an antibody-antigen reaction destroys the B cell lymphocytes as well as the allergens. The injured

cells release histamine which causes tissue inflammation and contraction and constriction of the smooth muscle fibres, particularly in the blood vessels and breathing tubes. Histamine also increases the permeability of blood vessels so that fluid moves from the vessels to the interstitial spaces causing edema. In severe allergic reactions, prolonged effects of histamine may cause anaphylactic shock and even death.

Although the antigen-antibody response is essential to survival, individuals who are overly reactive to an antigen are said to be 'allergic' or 'hypersensitive'. The present research is concerned with a particular class of allergies called Type I allergies which are mediated by the antibody immunoglobulin E (IgE). IgE immunoglobulins are commonly found on the surface of the plasma membrane of basophil and mast cells of the connective tissue (Rhoades & Pflanzer, 1992).

Type I allergies include asthma, eczema, urticaria (i.e., hives), hay fever, and perennial rhinitis. The symptoms produced by the various Type I allergies differ. For example, according to Taber's cyclopedic medical dictionary (1982), asthma is a condition of wheezing and difficult breathing caused by bronchial spasms or swelling of their mucous membranes. Eczema is acute or chronic inflammation of the skin characterised by erythema, pustules, scales, scabs, crusts, itching and burning. It is commonly referred to as

contact dermatitis and has no specific etiology. Urticaria is a vascular reaction of the skin which produces wheals and severe itching. For individuals suffering from urticaria, ingestion of certain foods often results in the above symptoms. Hay fever is an allergic disease that affects the mucous membranes of the nose and upper respiratory tract. Symptoms include inflammation, catarrh, headache, coryza, watery eyes, and asthmatic-like symptoms. Hay fever is caused by inhaling air-borne pollens at particular times of the year (e.g., spring, fall). Perennial allergic rhinitis is a condition that resembles hay fever except that it is triggered by inhaling any one or more of a variety of allergens including dust, pollen, and animal dander or from ingestion of foods or drugs to which the individual is allergic. Although perennial allergic rhinitis occasionally occurs at a later age, approximately 80% of individuals develop symptoms before the age of 30 years (Kaliner, Peyton, Eggleston, & Mathews, 1987).

A few researchers have investigated the relation between the prevalence of allergic disorders and gender. Although Bell et al. (1991) and Matussek et al. (1983) reported a higher prevalence of allergies in females, Barbee, Lebowitz, Thompson, and Burrows (1976) and Wiley and Golstein (1991) found no difference in the prevalence of allergic reactions between males and females. However, Barbee et al. reported an age relation to allergic reactivity with the highest

reactivity occurring between the ages of 30 and 35.

Depression

The depressive state has been recognised for many years; even the Old Testament's book of Job describes various depressive symptoms (Schuyler, 1974). The symptoms of depression have a wide spectrum and range from general melancholia and discouragement (mild depression) to feelings of hopelessness and utter despair (severe depression). Schuyler noted that while depression has been reported in the majority of places around the world, fewer depressed patients were found in the more "primitive" cultures. He suggested that this may be due to cultural differences and wide variations in education rather than geographic location.

It is important to distinguish between reactive and endogenous depression. Schuyler (1974) indicated that reactive depression occurs in response to an external precipitating event such as the death of a loved one. Endogenous depression on the other hand, is thought to occur in the absence of a precipitating event, includes the predominance of somatic synmptoms, and is assumed to be biologically based (Schuyler).

According to Schuyler (1974), there are four generally accepted theories of depression: biological, cognitive, psychoanalytic and behaviourial. Biological theories are

founded on the notion that depression may run in families (i.e., there is a genetic component involved), that depressive episodes correspond to fluctuations in hormones (e.g., postpartum and pre-menstrual depression), that medications and electroconvulsive therapy are reported to relieve symptoms of some depressive states, that depressive symptoms are not restricted to any particular age, race, culture or era (which suggests a physiological basis) and finally, that symptoms of depression frequently include altered physiological states (e.g., changes in sleep, appetite and bowel function). These assumptions are made on the basis that the biological abnormality that occurs in depression is located within the central nervous system, and most notably within the brain.

The cognitive models of depression propose that depression is the result of an individual's illogical thinking about themselves and their situation (Carson et al., 1988). It is an individual's negative thoughts that result in depressive symptoms. It is assumed that by changing the way one thinks (i.e., by identifying and correcting particular irrational beliefs), a corresponding change in emotional state will follow.

The psychoanalytic theories of depression postulate that underlying issues and conflicts, usually occurring early in childhood are the fundamental bases for depressive states. These theories have been heavily criticised for their

untestable hypotheses.

Finally, behaviourial models of depression propose that inadequate positive reinforcement following behaviourial actions results in depressive states (Schuyler, 1974).

While no one theory seems able to explain the totality of all depressive phenomena, each model may be valid in particular depressive states. For the purpose of the present study, it is the biological model that serves as the most interest. Given that allergies, depression and shyness may each have a biological basis, further research in these areas may suggest a common biological link or pathway that may not only increase knowledge and understanding but may also have implications for treatment.

Considerable research has been done to investigate the relationship between depression and gender. While depression may be experienced in both children and adults, it is generally accepted that adult females are considerably more at risk than adult males (Correll, 1984; Funabiki, Bologna, Pepping, & FitzGerald, 1980; Krause, 1986; Lewinsohn, Duncan, Stanton, & Hautzinger, 1986; Lewinsohn, Fenn, Stanton, & Franklin, 1986; McDermott, 1987; Weissman & Klerman, 1977, Weissman, Leaf, Holzer, Myers, & Tischler, 1984). In fact, several studies indicate that women's risk for depression exceeds that of men by a ratio of 2:1 (Carey, Gottesman, & Robins, 1980; Weissman & Klerman, 1977, Weissman et al., 1984). A few studies (e.g., Dobson, 1985; Golding, 1988)

however, failed to find gender differences in levels of depression. Golding suggested that apparent increases in depression levels in females are related to the few women who score in the extreme upper tail of the distribution and that the effect of gender on depression may be explained indirectly (i.e., due to gender differences in education, employment, job status and income). In contrast, among prepubescent children, boys consistently report more depressive symptoms than girls (Nolen-Hoeksma, Girgus, & Seligman, 1991; Petersen, Sarigiani, & Kennedy, 1991).

There is little consensus regarding the relationship between depression levels and age. Barnes, Currie, and Segall (1988) found that symptoms of depression were most common in younger and less common in older participants of their study. However, Berry, Storandt, and Coyne (1984), reported that age differences in psychological symptoms of depression between college students and community-dwelling older adults were not significant. Correll (1984), on the other hand, found that while males showed significant increase in depression levels with age, females did not.

Shyness

The construct of shyness was not studied until the last decade. While related constructs such as introversion and social anxiety were frequently the topic of investigation,

few studies explored the nature of shyness as a separate entity. Shyness is an internal force that prevents people from making and maintaining social alliances (Zimbardo, 1986). Typically, shy individuals have difficulty being assertive and expressing their own opinions even when they feel it is appropriate. Over time, the shy person becomes alienated from self and others for fear of judgement, criticism, and rejection of their ideas or performance. The experience of shyness has both verbal and nonverbal components which may be manifested cognitively, physiologically (i.e., activation of the sympathetic or parasympathetic division of the nervous system), emotionally, and behaviourally (Zimbardo). For example, while in the presence of others the shy person may engage in negative self-talk, experience an increase in heart-rate, feel upset or embarrassed and decide to avoid future social situations in which they fear they may be uncomfortable. Sometimes others may interpret the shy person's behaviour as unfriendly, excessively quiet, or even snobbish. Shyness can make even the most intelligent and caring of people appear dull, indifferent and aloof (Zimbardo). The consequences of shyness can be severe, ranging from loneliness, sexual difficulties and low self-esteem to excessive drug and alcohol use, particularly when used as an aid to cope with social situations.

According to Buss (1986) there are two types of trait shyness: fearful shyness and self-conscious shyness. Fearful shyness begins during the first year of life when infants develop fear and anxiety in the presence of strangers. Fearful shyness requires no sense of self and is related to threats of danger. Its immediate causes are intrusion and social novelty. Children who have a fearful and emotional personality, are bullied by others or are inadequately socialised may be more vulnerable to fearful shyness. This type of shyness begins to wane as children mature and become habituated to social novelty. Several years later, children become subject to social evaluation. At this stage they become aware that friendliness, attractiveness, social skills and conforming to cultural norms are required in order to be accepted by others. Social inhibition results as the child becomes socially cautious and fearful of rejection. Shyness of this type requires an individual to have a sense of self. Self-conscious shyness, on the other hand, requires one to not only possess a sense of self but also to be aware of the self as a social object. As a cognitive component is required in this type of shyness it is only present in older children (i.e., four or five years of age) and adults. Self-conscious shyness occurs when one is acutely self-aware of oneself in social situations. Individuals feel excessively exposed and scrutinised in the presence of others and usually experience considerable embarrassment. The immediate causes of self-

conscious shyness include attending formal situations (i.e., experiencing a difference in social status), feeling invaded (i.e., breach of privacy), feeling uniquely different, and being socially evaluated by others. Like fearful shyness, self-conscious shyness may be related to inadequate social skills but it differs in that it is a consequence of excessive socialisation training.

Although shyness is often considered a feminine characteristic, there is no compelling evidence that females are more shy than males (Crozier, 1986). Bell et al. (1993), Foley, Heath & Chabot (1986), and Kamath and Kanekar (1993) reported no gender differences in levels of shyness. Zimbardo (1986) also found no differences in levels of shyness between males and females except for a slightly greater incidence among adolescent females as opposed to adolescent males.

As shyness is considered an inherited biological trait it is assumed to be a life-long behaviourial trait and therefore has no specific correlates with age. Crozier and Burnham (1990) reported that although fearful shyness developmentally precedes self-conscious shyness, this transition does not occur at age five or six as Buss (1986) postulated but occurs between the ages of seven and eight. This finding is consistent with the notion that children develop the capacity for self-reflection and the ability to take another's perspective at the same age (Crozier & Burnham).

Allergies and Depression

A relationship between allergic disorder and depression has been observed in adults in both clinical and nonclinical populations (Gauci et al., 1993; Matussek et al, 1983). For example, Preston (1969) surveyed more than 1100 patients in a dermatological clinic and found that 70% of patients suffering from eczema and 84% of patients with chronic urticaria also suffered from depression. Preston described the depression in these patients as 'mild' and indicated that it often responded dramatically to antidepressant drug therapy. Associated with an improvement in depression was an increased resolution of the skin disorder. Concurrent improvement of both depression and eczema may be indicative of a biological or psychological relationship between the two.

Other research has indicated that the frequency of allergic disorder is related to a specific type of depression. Matussek et al. (1983) studied correlations between psychiatric diagnosis (i.e., neurotic depressive, bipolar endogenous depressive, and monopolar endogenous depressive), allergic disorder, and gender. Approximately 20% of the total sample (i.e., 6 men and 37 women) reported allergic disorders. Results indicated that only when the item 'monopolar endogenous depression' occurred in combination with the item 'female sex' was there an increase in the

frequency of allergic disorder. Thus, the authors concluded that the frequency of allergic disorder varies with different psychiatric diagnoses. In addition, while monoendogenous depressive men seemed to be more at risk for developing allergic eczema than nondepressive men, females with the same psychiatric diagnosis suffered from other types of allergic disorders, including allergic eczema.

Research dealing specifically with asthmatic individuals has been carried out by Teiramaa (1979). Teiramma divided adult asthmatic patients into four groups according to age at time of onset (i.e., 0-16, 17-27, 28-35, and 36-48 years). Results indicated that subjects in the second group (i.e., onset at 17-27 years) least often suffered from depression, whereas subjects in the third group (i.e., onset at 28-35 years) most often suffered from depression. These results suggest that the time of onset of allergic disorders may be related to psychological dysfunction.

The relationship between depression and allergies has also been observed in children. Depression in early childhood is characterised by irritability, crying, and insomnia. Depressed infants present with a serious and often frowning expression and do not seem to be comforted by cuddling (Ossofsky, 1974). Ossofsky examined the medical records of a group of children treated with imipramine (a tricyclic antidepressant drug) for a variety of disorders that included depressive symptoms. It was noted that 45% of the children

had atopic allergies as confirmed by a paediatric allergist. In addition, 70% of the children had at least one other relative who had been treated for depression. These findings raise the possibility of a biological component in both allergies and depression.

The association between Type I allergies and depression has also been investigated in a nonclinical population. Bell et al. (1991) surveyed college students and found that 71% of subjects who were at some time professionally diagnosed with depression also reported a history of allergies. However, while depression severity was associated with a higher prevalence of allergies (and in particular, asthma), the total number of allergies and the number of specific allergens to which subjects reported allergies were not associated with a greater frequency of depression. Moreover, although allergic subjects did not differ from nonallergic subjects in self-rated <u>current</u> depression, subjects with greater self-rated current depression reported a higher incidence of asthma. These results suggest that individuals prone to depression have more allergies than nondepressives. In addition, Type I allergic subjects consistently reported a significantly worse mood following an episode of the flu than did nonallergic subjects. Bell et al. suggested that immunological overload resulting from allergens and infection (i.e., the flu) could lead to even greater depression in

allergic individuals.

However, Schleifer, Keller, Bond, Cohen, and Stein (1989) commented that although an association between altered immunity and depression has been suggested by a number of studies, it has not been consistently demonstrated. Schleifer et al. studied a sample of patients with major depressive disorder and reported that there were no mean differences in immunological tests (i.e., mitogen-induced lymphocyte proliferation, lymphocyte subsets, and natural killer cell activity) when compared to a control group. These findings are in contrast with earlier studies that indicated impaired lymphocyte function in older and more severely depressed patients (Schleifer et al., 1984). Thus, although altered immunity did not appear to be a specific biologic correlate of depression, it may occur in age-related subgroups of depressed individuals (Schleifer et al.).

Teiramma (1978a) investigated psychic disturbances and the duration of asthma and found no significant relationship between depression and the number of years patients had been subject to the disorder. Similarly, in a follow up study, Teiramma (1978b) investigated psychic disturbances and the severity of asthma. Patients were divided into four groups, depending on their need for medication. Results indicated that the group who used beta 2 receptor-stimulating inhalants, as opposed to the group who regularly used corticoids had the highest depression scores. According to

Teiramma (1978b), these results suggest that a long duration of asthma is not, to a large extent, responsible for the psychic properties of the patient and that based on other neurotic and psychosomatic symptoms as revealed by questionnaires, decompensated psychological defences and poor coping mechanisms may be implemented in the etiology of psychosomatic disorders, and may possibly have an impact on the severity of asthma. Teiramma (1978b) indicated that a large sub-group of patients demonstrated strong repression and denial on which they may have been dependent to maintain their psychical equilibrium.

Allergies and Shyness

Research directly investigating the relationship between shyness and allergies is sparse. However, in one study, two groups of behaviourally inhibited (i.e., shy) and uninhibited (i.e., outgoing) children aged 21 and 31 months were observed until they were over 8 years of age (Kagan et al., 1991). The authors found a greater prevalence (32%) of hay fever allergies in first and second degree relatives of the socially inhibited children in comparison with relatives of the uninhibited children (14%). Moreover, 64% of the inhibited children, in comparison with 25% of the uninhibited children had at least one parent with hay fever. In addition, significantly more relatives of the inhibited children (11%)

had high social anxiety scores in comparison to the relatives of the uninhibited children (1%). While the bases for these associations are unclear, it is possible that shyness and allergies have a strong genetic component.

Although Teiramma (1978b) failed to find a relationship between depression and the severity of asthma, it was noted that patients with the most severe asthma were also the most introverted. In a follow-up study, Teiramaa (1978c) investigated psychosocial factors in the course of asthma. Patients were divided into two groups, one with a favourable, the other with an unfavourable course in condition. Both groups were given questionnaires and a psychiatric interview. Results indicated that subjects who were most extroverted almost always belonged to the "favourable" group while those in the 'unfavourable" group showed overall poorer psychosocial adaptation. Teiramaa indicated that these results suggest that a low level of introversion (shyness) and/or a lack of psychic symptoms may have a beneficial effect on the course of asthma. Yet, it also seems possible that the severity of asthma may be partly responsible for or a concomitant of the degree of psychosocial adaptation. In contrast to the above study, Wistuba (1986) compared 'high' and 'low' allergic potential in asthmatics and found no significant differences in personality or psychosocial adaptation.

Shyness and Depression

Extreme degrees of social introversion in adults and behaviourial inhibition in children have been related to increased levels of depression in both clinical and nonclinical populations (Bell et al., 1990). Johnson et al. (1991) found that attributional patterns of shy individuals overlapped with those reported by depressed individuals. Gauci et al. (1993) observed that allergic individuals who scored high on the Social Introversion Scale also scored high on the Depression Scale on the Minnesota Multiphasic Personality Inventory (MMPI). Given that shyness is a chronic and enduring trait, it seems reasonable to speculate that shy individuals would be more susceptible to more chronic and severe depressive disorders than individuals who are prone to depression but who are not shy (Bell, 1992). Thus, given that depression and allergies have been related, and shyness and depression have also been related, one may speculate that shy individuals with allergic disorders would be more depressed than individuals who have allergies but are not shy.

Allergies, Depression, and Shyness

Bell et al. (1990) examined the frequency of allergies in individuals with various degrees of self-reported shyness. Results indicated that extremely shy adults had a higher prevalence of hay fever than did extremely outgoing

individuals. In addition, subjects who rated themselves high in shyness also rated themselves higher in current depression. The relationship between shyness and hay fever was not significant for other allergies. The authors added that although the chronic stress of allergies could impair psychological development and contribute to shyness, this relationship seems unlikely because the relationship between shyness and hay fever did not hold for shyness and asthma (cf. Teiramma, 1978b) or multiple allergic manifestation. Thus, Bell et al. postulated that shyness is a stable, temperamental trait in an individual who has genetic and/or biological susceptibility to nasal allergies. The authors suggested that these results may indicate significant differences in physiology of the immune and nervous system of shy and outgoing people. The authors further speculated that hay fever may be related to shyness in part because the nose is more anatomically related to the brain than are other allergic organs (e.g., skin, lungs).

In a later study, Bell et al. (1993) found that in a selected group of older individuals (i.e., 50-88 years), those with hay fever, constipation, and insomnia were more shy than those without these problems. In addition, shyness scores positively correlated with depression scores. However, as Hansson (1986) points out, in the elderly, shyness (and possibly depression) may largely reflect an emotional response to poorer health, increased physical dependency and

social isolation rather than hay fever per se.

Gauci et al. (1993) investigated the relationship between individuals suffering from allergic rhinitis (determined by a medical skin prick test) and personality traits in a nonpsychiatric population. Forty female subjects (i.e., 22 allergic and 18 nonallergic subjects) aged between 19 and 68 years were administered the Minnesota Multiphasic Personality Inventory. Allergic subjects scored significantly higher on the Hypochondriasis and Social Introversion scales and significantly lower on the Correction and Ego Strength scales. These results indicate that females with perennial allergic rhinitis have a greater tendency to prefer being alone and that they generally show poorer psychological functioning than nonallergic females. However, while the mean Social Introversion score was significantly higher for the allergic group compared with the control group, it was within the normal scoring range and was therefore not clinically significant. In addition, the number of allergens to which subjects reported allergies was positively correlated with scores on the hypochondriasis, Depression, Hysteria, Psychasthenia, Schizophrenia, Social Introversion, and Conscious Anxiety scales, and negatively correlated with scores on the Correction and Ego Strength scales. While these results are consistent with Bell et al. (1990) who reported that high shyness scores were related to the number of allergens to which subjects reported allergies, they are

inconsistent with the finding that the number of allergens to which an individual was allergic was not associated with a greater frequency of depression (Bell et al., 1991). Finally, Gauci et al. noted that although seasonal (i.e., hay fever) and perennial allergic rhinitis were both associated with shyness, only seasonal allergic rhinitis was associated with depression.

Problems in the Literature

Taken together, these studies are difficult to interpret due to the inconsistency of the results. According to Gauci et al. (1993), the use of a heterogeneous sample representing various Type I allergic disorders casts doubt on the validity of research findings. Given the differences in symptoms and severity of Type I allergies, it is possible that the psychological functioning of individuals with different allergic disorders will also differ. Thus generalisations based on studies implementing heterogeneous samples of Type I allergic individuals are limited as a consequence of unequal representation of each allergic group by different proportions of subjects. Although this is a valid point, it also appears that there are somé benefits to surveying a heterogeneous group provided they are homogenous in other aspects such as socio-economic status and level of education. These two variables alone could have confounding effects on

the psychological dysfunction of the individual and consequently the levels of depression and shyness reported. Therefore, in the present study a homogenous group with respect to level of education and socio-economic status will be used.

In addition, differences and flaws in the design of many studies has made comparison between studies difficult. For example, some studies used a small sample size (e.g., Gauci et al., 1993), while other studies used samples limited to a specific age group (e.g., Matussek et al., 1983) or gender (e.g., Gauci et al.). Moreover, some researchers developed their own instruments for measurements of variables (e.g., Bell et al., 1990, 1991) of which the reliability and validity of the instruments are unknown. As well, other studies implemented undergraduate psychology students as subjects (e.g., Bell et al., 1991) and it is well documented that volunteers often differ in many characteristics than nonvolunteers (Borg & Gall, 1989). Also, as depression is a fairly common affect among college students, this finding may not have been associated with hay fever and allergies as much as it was with examinations and disappointing grades.

Summary

Despite the ambiguities and methodological flaws in the research involving the variables in question, there is some

evidence indicating possible relationships among allergies, depression, and shyness. A replicate or similar study implementing a less biased sample and instruments with established reliability and validity (to measure depression and shyness) would assist in determining the strength of the relationships among allergies, depression, and shyness. Therefore, the present study will focus on the interaction among these three variables. In addition to investigating the relationships among allergies (i.e., type, number, severity of symptoms, and age of onset), depression (past and current) and shyness, consideration will also be given to age and gender. The present study is an exploration of correlational relationships and does not attempt to determine causality.

Hypotheses

The following 19 testable hypotheses emerge from the previous review:

1. Allergic disorder and depression will be positively correlated.
2. Hay fever allergies and shyness will be positively correlated.
3. Allergic disorder and depression will be more highly correlated than allergic disorder and shyness.
4. Higher levels of shyness will be positively correlated with higher levels of depression.

5. Allergic disorder and higher levels of shyness will be more highly correlated with depression than will allergic disorder and lower or average levels of shyness and depression.

6. There will be no relationship between the number of allergies reported and levels of depression.

7. There will be a positive relationship between the number of allergies reported and levels of shyness.

8. There will be no relationship between the number of allergens reported and levels of depression.

9. There will be a positive relationship between the number of allergens reported and levels of shyness.

10. Females will report more allergic disorders than males.

11. Females will report higher levels of depression than males.

12. There will be no significant difference in shyness between males and females.

13. There will be no relationship between current age and depression.

14. There will be no relationship between current age and shyness.

15. There will a relationship between current age and number of allergies reported. (i.e., those who are between the ages 30 and 35 years will report more allergic disorders than those in other age groups).

16. Those who report moderate or severe allergic symptoms will report higher levels of depression than those who report mild allergic symptoms.

17. Those who report moderate or severe allergic symptoms will report higher levels of shyness than those who report mild allergic symptoms.

18. There will be a significant relationship between age of onset of allergies and levels of depression. (i.e., Those who report the onset of allergic disorder(s) between the ages of 28 and 35 years will report higher levels of depression than those who report onset at other ages).

19. There will be a significant relationship between age of onset of allergies and levels of shyness. (i.e., Those who report the onset of allergic disorder(s) between the ages of 28 and 35 years will report higher levels of shyness than those who report onset at other ages).

III. METHOD AND PROCEDURE

This study is designed to investigate the relationships among allergies, depression and shyness. In this chapter, the method and procedural design used in this project is discussed. First, the nature of the participants is described. Following this, a description of each of the instruments along with reliability and validity findings is provided. Finally, a discussion of how the data were analysed is presented.

Subjects

Three hundred and eighty six students enrolled in educational psychology classes during the 1996 Fall semester at the University of Alberta served as subjects for this study. Given that college students frequently suffer from depression as a consequence of disappointing grades, all students were surveyed at the beginning of the school year,(except approximately 50 students who were surveyed on the final day of classes in mid October five days before the start of their teaching practicums) in attempt to alleviate any confounding variables related to examinations. All students were in their third year of university studies and were pursuing a teaching degree. No stipulations were made on the basis of age, race or gender in this study.

Procedure

The researcher entered each class and informed the students about the general nature of the study. Students were asked to participate voluntarily. Participants were assured that their responses would be both anonymous and confidential and that they may discontinue participation at any time without explanation. It was explained that the results of the study would be made available to each participant at the completion of the project. All questions were answered at this time, provided they did not concern the specific hypotheses of the study. Each participant was asked to complete the Social Reticence Scale, the Beck Depression Inventory and the Allergic Disorder Inventory, in that order. All questionnaires took approximately 15 minutes to complete. At the conclusion of the session (i.e., when all questionnaires were completed) all participants were provided with a project-specific debriefing explaining the nature, goals and hypotheses of the investigation.

Instruments

Social Reticence Scale

The Social Reticence Scale (SRS) (Jones & Briggs, 1986) is a 20 item self-administered scale designed to measure an individual's shyness, a form of social anxiety in which self-focus and reticence prevent effective functioning in social

situations (Jones & Briggs). As shyness may be construed as a socially undesirable characteristic, the word "shyness" is not used in the scale in attempt to avoid respondent sensitisation. Also, as the content of some items may prove embarrassing to some respondents, it is recommended that administration of the scale include verbal instructions that emphasise the confidentiality of the subjects' answers to better ensure valid and reliable responses. Each item on the SRS is rated on a 5-point Likert-type scale (i.e., 1 = not at all characteristic to 5 = extremely characteristic) with one-half of the items being scored in the reverse direction. The SRS takes approximately 5 to 10 min to administer.

According to the SRS Manual (Jones & Briggs, 1986), the original SRS was normed primarily on college students (N = 2,250) but samples of high school students, general adults, convicted felons, hospital workers and parents of adolescents were also included. Normative data for males and females are presented both separately and combined. Individuals scoring higher on the SRS indicate that they experience various affective, cognitive and behaviourial difficulties in situations involving strangers and groups of people. In addition, higher SRS scores are associated with self-descriptions such as quiet, isolated, left-out, inferior, dejected and pained in both males and females. While the SRS is useful for research purposes it should not be used for individual clinical diagnoses as it is not yet

clear at what point SRS scores are representative of clinically significant interpersonal problems.

Despite adequate validity and reliability of the original SRS, the current version of the SRS (which contains 10 of the original items slightly rewritten and 10 new items) was designed to help eliminate acquiescence response sets that may confound results (Reinehr, 1992). The psychometric properties of the revised SRS are also good. The SRS manual (Jones & Briggs, 1986) reports a full scale test-retest reliability coefficient of .87 based on 101 college students who took the SRS on two separate occasions with 8 weeks between administrations. Estimates of internal reliability that are based on a sample of 252 college students are reported as above .90. The mean inter-item correlation is also satisfactory at r=.33. Factor analysis revealed that the SRS has two main factors: one group of items that assesses feelings of isolation from others and another group of items that deals with the difficulty or ease of communication with others. Factor loadings were comparable across two samples indicating that the factor structure is replicable.

The SRS manual (Jones & Briggs, 1986) also provides several types of validity. Convergent validity was determined by correlating total SRS scores with shyness self-labelling (i.e., "Basically, I am a shy person"). Results indicated that r=.67, p=<.01 for a sample of 252 college students.

With respect to content validity, items chosen for the SRS were derived from findings reported by Zimbardo, Pilkonis and Norwood (1975) as a consequence of interviews with shy college students.

Evidence of construct validity was determined by comparing the SRS to other measures of emotionality and personality. For example, Jones and Carpenter (1986) reported significant correlations (i.e., $r=.59$, $p=<.01$) between scores on the SRS and scores on the UCLA Loneliness scale (Russell, Peplau, & Cutrona, 1980). Other findings reported in the manual (Jones & Briggs, 1986) indicate that SRS scores are inversely related ($r= -.18$, $p=.01$) to the number of social support networks and to the degree of satisfaction with an individual's present relationships ($r= -.26$, $p=.01$). Given that shyness contributes to fewer and less satisfying relationships, these data provide support for the validity of the SRS.

As evidence of predictive validity, SRS scores were obtained from 128 college students at the beginning of the semester and again two months into the term. SRS scores were inversely related to the amount of social support, the density of the social network, the number of new friends made, and the number of social activities (Jones & Briggs, 1986). In addition, Jones, Briggs and Smith (1986) reported that SRS scores predicted judges' ratings of shyness for a group of college students observed individually for a two

minute period (r=.50, p=.002).

Finally, The SRS manual (Jones & Briggs, 1986) reports that discriminant validity of the SRS was established by demonstrating that SRS scores were more closely correlated with other measures of shyness (e.g., r= .79) than they were with measures of related constructs (e.g., sociability, r= -.53).

In summary, the SRS is short, easy to administer, and for research purposes, possesses acceptable levels of validity and reliability. This makes it an appropriate choice for the present study.

Beck Depression Inventory

The Beck Depression Inventory (BDI) (Beck, Rush, Shaw, & Emery, 1979) is a standardised questionnaire consisting of 21 multiple-choice items designed to measure the presence and degree of depression. Each multiple-choice item corresponds to one of the following depressive symptoms and/or attitudes: sadness, pessimism, sense of failure, dissatisfaction, guilt, expectation of punishment, self-dislike, self-accusation, suicidal ideation, crying, irritability, social withdrawal, indecisiveness, body image distortion, work retardation, insomnia, fatigue, anorexia, weight loss, somatic preoccupation and loss of libido (Stehouwer, 1985). As these symptoms are common to both

reactive and endogenous depression, the BDI is unable to distinguish between these two depressive states.

Items chosen for the BDI were based both on research and clinical observation and are intended to cover the affective, cognitive, motivational, and physiological aspects of depression (Welch, Hall & Walkey, 1990). The items chosen for the BDI are not intended to reflect any one theory of depression (Beck & Steer, 1993). Subjects are asked to respond to the one statement that best describes the way they have been feeling during the last week. Subjects answer the items on a 4-point scale of 0 to 3 with higher total scores indicating greater severity of depression. Categories of depression range from mild to severe. A score falling in the range of 0 to 9 is usually considered normal and is therefore not indicative of depression. The BDI takes approximately 5 to 15 minutes to administer.

A meta-analysis of research literature spanning 25 years was conducted by Beck, Steer and Garbin (1988). Reports of internal consistency estimates for nonpsychiatric samples were high and ranged from .73 to .92 with a mean coefficient alpha of .81. Stability of the BDI, assessed using a test-retest design is also good and produced coefficients ranging from .60 to .83.

With respect to validity, Beck, Steer and Garbin (1988) reported that the mean correlation coefficient demonstrating concurrent validity between the BDI and clinical ratings is

.60. The BDI also has concurrent validity with other well researched measures of depression which together, produced a mean correlation of .60. In support of discriminant validity, the meta-analysis revealed that the BDI was able to differentiate between psychiatric and nonpsychiatric samples as well as different types of depression (i.e., major depression and dysthymia). Construct validity, which was reported as strong, was determined by comparing BDI scores to other indicators of depression such as suicide, alcoholism and student maladjustment.

Finally, Tashakkori, Barefoot and Mehryar (1989) reported that the BDI is a useful measure of depression in both college students and non-western cultures (of which individuals comprise a substantial part of the university population) which makes the BDI an appropriate instrument for the present study.

Allergic Disorder Inventory

The Allergic Disorder Inventory (ADI) is a two page self-report questionnaire designed by the author. It was developed as a means of acquiring information related to the age and gender of the participants, to determine if they had at any time been professionally diagnosed with depression, and to determine if they suffered from allergies. Those participants who reported that they suffered from allergies

were then asked if their allergies had been confirmed by medical skin prick tests, to check the allergens to which they were allergic, to describe the severity of their symptoms (i.e., as mild, moderate or severe) without the use of medication and to provide the age at which the allergic disorder first occurred.

Data Analysis

To explore the direction and strength of the relationships among allergic disorder, shyness and depression a correlation matrix was generated. Descriptive statistics such as the mean, standard deviation and range of each variable were also reported. To determine if individuals who reported allergic disorder and higher than average levels of shyness also reported higher levels of depression than those who reported allergic disorder and average or lower than average levels of shyness a two-factor analysis of variance was implemented. To assess the relationship between gender and the number of allergies, depression, and shyness as well as the relationship between the severity of allergies and a history of depression correlations were performed. To determine if there were significant differences between: a)current age and the number of allergies reported, b)current age and depression, c)current age and shyness, d)severity of symptoms and current depression, e)severity of symptoms and

shyness, f)age of onset of allergies and depression and g), age of onset of allergies and shyness several one-way analyses of variance were performed. To determine which particular age groups were significantly different from other age groups, a Bonferroni test was employed. The criterion level for assessing significance was set at .05 for all analyses.

IV. RESULTS

To provide a thorough understanding of the findings of the present research, this chapter begins with a statistical description of the participants as well as the most relevant variables used in the study. Following this, a restatement of each hypothesis, pertinent statistics and appropriate conclusions are presented.

Table 1

Data Summary of Gender and Age

Variable	Frequency	%
GENDER:		
Females	254	65.8
Males	132	34.2
AGE:		
19-24	258	67.3
25-30	83	21.7
31-35	21	5.5
36-40	16	4.2
41-55	5	1.3

Mean age = 24.36 (S.D.= 5.18)

Range = 36 Minimum = 19 Maximum = 55

Table 2

Data Summary of Allergic Disorders

Variable	Frequency	%
ALLERGIC DISORDER:		
Asthma	56	14.5
Eczema	33	8.5
Hay fever	104	26.0
Hives	36	9.3
Perennial Rhinitis	27	7.0
TOTAL NUMBER OF ALLERGIES:		
0	219	56.7
1	109	28.2
2	36	9.3
3	14	3.6
4	6	1.6
5	2	0.5

Number of subjects whose allergies were confirmed by medical skin prick tests = 72 or 43.6%

Table 3

Means, Standard Deviations, Minimums, Maximums, and Range of Scores for the Total Sample on Shyness and Current Depression

	Mean	S.D.	Min.	Max.	Range
SHYNESS:	46.05	11.97	20	84	64
CURRENT DEPRESSION:	7.11	6.76	0	66	66

Table 4

Frequency of History of Depression

Variable	Frequency	%
HISTORY OF DEPRESSION:	35.00	9.10

Table 5

Data Summary on Ratings of Severity of Allergic Disorders Without the Use of Medication

Allergy	Severity	Frequency	%
ASTHMA:	mild	34	61.8
	moderate	17	30.9
	severe	3	7.3
ECZEMA:	mild	19	59.4
	moderate	7	21.9
	severe	6	18.8
HAY FEVER:	mild	38	37.6
	moderate	43	42.6
	severe	19	18.8
HIVES:	mild	21	65.6
	moderate	7	21.9
	severe	4	12.5
PERENNIAL RHINITIS:	mild	4	16.0
	moderate	15	60.0
	severe	6	24.0

Table 6

Means, Standard Deviations, Minimums, Maximums, and Range of Scores for the Total Sample on Age of Onset of Allergic Disorders

Variable	Mean	S.D.	Min.	Max.	Range
AGE OF ONSET/ASTHMA:	11.41	7.31	0	30	30
AGE OF ONSET/ECZEMA:	11.84	9.01	0	33	37
AGE OF ONSET/HIVES:	9.62	7.37	0	30	30
AGE OF ONSET/HAY FEVER:	12.01	6.73	0	31	31
AGE OF ONSET/RHINITIS:	10.72	8.67	0	30	30

Hypotheses 1, 2, 3, and 4

Hypothesis 1: Allergic disorder and depression will be positively correlated.

Hypothesis 2: Hay fever allergies and shyness will be positively correlated.

Hypothesis 3: Allergic disorder and depression will be more

highly correlated than allergic disorder and shyness.

Hypothesis 4: Higher levels of shyness will be positively correlated with higher levels of depression.

Analysis: To determine the relationships among allergic disorder, depression, and shyness a correlation matrix was generated as presented in the following table.

Table 7

Correlation Coefficients for the Variables Allergic Disorder, Depression, and Shyness

	BDI	HXDEP	SRS
Asthma	.20**	.08	.02
Eczema	.07	.03	.00
Hives	.11*	.12*	-.01
Hay Fever	-.05	.05	-.06
Perennial Rhinitis	.06	.09	.02
BDI		.27**	.31**
Hx Dep			.16**

* p = or <.05

** p = or <.001

Conclusion: Significant positive correlations exist between asthma and current (BDI) depression and between hives and current and past (Hx Dep) depression. Therefore, hypothesis 1 is supported.

Hay fever allergies (or any other allergy) and shyness scores are not positively correlated. In fact, there is a slight (nonsignificant) negative correlation between hay fever allergies and shyness scores. Consequently, hypothesis 2 is not supported.

Since allergic disorder and shyness are not correlated hypothesis 3 is supported, allergic disorder and depression are more highly correlated than allergic disorder and shyness.

Higher levels of shyness are significantly correlated with higher levels of current depression as well as a history of depression, therefore hypothesis 4 is supported.

Hypothesis 5:

Hypothesis 5 states that allergic disorder and higher levels (i.e., > mean) of shyness will be more positively correlated with depression than will allergic disorder and lower levels (i.e., < or = mean) of shyness.

Analysis: To investigate the relationship between allergic disorder and different levels of shyness and past and current

depression, two two-factor analyses of variance were generated as presented in tables 8 and 9.

Table 8

Two-factor Analysis of Variance Comparing Allergies and Shyness and a History of Depression

Source	df	SS	MS	F	Fprob
Allergies (A)	1	.40	.40	4.91	.03
Shyness (B)	1	.68	.68	8.44	.00
AB	1	.05	.05	.58	.45
Error	382	30.77	.08		

Table 9

Two-factor Analysis of Variance Comparing Allergies and Shyness and Current Depression

Source	df	SS	MS	F	Fprob
Allergies (A)	1	190.98	190.98	4.50	.04
Shyness (B)	1	1189.25	1189.25	28.02	.00
AB	1	151.76	151.76	3.58	.06
Error	382	16213.29	42.44		

Conclusion: As can be seen from table 8, allergic disorder and higher levels of shyness are not more interactive with a history of depression than are allergic disorder and lower or average levels of shyness and a history of depression. Similarly, as evident in table 9, allergic disorder and higher levels of shyness are not more interactive with current depression than are allergic disorder and lower or average levels of shyness and current depression. Consequently, hypothesis 5 is rejected, there is no relationship between allergies and shyness as a single variable and depression.

Hypotheses 6, 7, 8, and 9

Hypothesis 6: There will be no relationship between the number of allergies reported and levels of depression.

Hypothesis 7: There will be a positive relationship between the number of allergies reported and levels of shyness.

Hypothesis 8: There will be no relationship between the number of allergens reported and levels of depression.

Hypothesis 9: There will be a positive relationship between the number of allergens reported and levels of shyness.

Analysis: To investigate the relationships between the number of allergies and allergens and levels of depression and shyness a correlation matrix was generated as observed in table 10.

Table 10

Correlation Coefficients for the Variables Number of Allergies, Number of Allergens, Depression and Shyness

	BDI	HXDEP	SRS
NUMBER OF ALLERGIES	.12*	.12*	-.02
NUMBER OF ALLERGENS	.04	.12	-.09

* p = < .05

Conclusion: As can be seen from table 10, a significant positive relationship exists between the number of allergies (i.e., multiple allergies) reported and current and past depression. Hypothesis 6 is therefore rejected, there is a relationship between the number of allergies reported and depression.

There is a negative relationship between the number of allergies reported and levels of shyness although it is not significant. Consequently, hypothesis 7 is rejected.

There is no significant relationship between the number of allergens reported and levels of current and past depression. Hypothesis 8 is therefore supported.

There is a negative relationship between the number of allergens reported and levels and shyness although it is not significant. Consequently, hypothesis 9 is rejected.

Hypotheses 10, 11, and 12

Hypothesis 10: Females will report more allergic disorders than males.

Hypothesis 11: Females will report higher levels of depression than males.

Hypothesis 12: There will be no significant difference in shyness between males and females.

Analysis: To determine if there are gender differences in the

number of allergic disorders as well as levels of depression and shyness a correlation matrix was generated as presented below.

Table 11

Correlation Coefficients for the Variables Gender, Depression, Shyness, and Number of Allergies

	BDI	HXDEP	SRS	ALLERGIES
GENDER	.05	.02	.01	.13*

* p = < .05

Conclusion: As can be seen from table 11, there is a significant difference between males and females in the number of allergies reported. Hypothesis 10 is therefore supported, females report more allergic disorders than males.

There is no significant difference between males and females in levels of depression. Consequently, hypothesis 11 is rejected, females do not report higher levels of depression than males.

As predicted, there is no significant difference between males and females in levels of shyness. Hypothesis 12 is therefore supported.

Hypotheses 13, 14 and 15

Hypothesis 13: There will be no relationship between current age and depression.

Hypothesis 14: There will be no relationship between current age and shyness.

Hypothesis 15: There will be a relationship between current age and the number of allergies reported.

Analysis: To investigate the relationships between age and current and past depression, age and shyness, and age and the number of allergies, several one way analyses of variance were performed.

Table 12

Analysis Of Variance Comparing Age Groups and History of Depression

Source	df	SS	MS	F	Fprob
Between Groups	4	2.80	.70	9.40	.00
Within Groups	378	28.18	.75		
Total	382	30.98			

Table 13

Analysis of Variance Comparing Age Groups and Current Depression

Source	df	SS	MS	F	Fprob
Between Groups	4	237.37	59.34	1.32	.26
Within Groups	378	17058.06	45.13		
Total	382	17295.43			

Table 14

Analysis of Variance Comparing Age Groups and Shyness

Source	df	SS	MS	F	Fprob
Between Groups	4	1093.70	273.42	1.93	.10
Within Groups	378	53479.24	141.48		
Total	382	54572.94			

Table 15

Analysis of Variance Comparing Age Groups and Number of Allergies

Source	df	SS	MS	F	Fprob
Main Effects	4	2.15	.54	.68	.61
Residual	161	127.14	.79		
Total	165	129.28	.78		

Conclusion: As can be observed from table 12, a significant difference is found among the different age groups reporting a history of depression.

A Bonferroni test was then employed to determine which age group(s) were significantly different from the others as presented in table 16.

Table 16

Bonferroni test Comparing Age Groups and History of Depression

Age Group	Mean Hx Dep
19-24	.95*
25-30	.90*
31-35	.86*
36-40	.56
41-55	.60

* p = < .05

Conclusion: As can be seen in table 16, the means for a history of depression for subjects between the ages of 19-35 are significantly different from the means for a history of depression for subjects between the ages of 36-55. In this study younger subjects reported a history of depression more frequently than older subjects. As observed in table 13, there is no significant difference between the various age groups and levels of current depression (p = < .05). However, since there is a significant positive relationship between the different age groups and a history of depression, hypothesis 13 is rejected, there is a significant difference

between the age groups for those who have a history of depression, with younger participants reporting more depression than older subjects.

As evident in table 14, there is no significant relationship between current age and levels of shyness, hypothesis 14 is therefore supported.

As can be seen from table 15, there is no significant relationship between current age and the number of allergies reported. Hypothesis 15 is therefore rejected.

Hypothesis 16 and 17

Hypothesis 16: There will be a positive relationship between the severity of allergic symptoms and depression (i.e., individuals reporting moderate or severe allergic symptoms will report higher levels of current depression or a greater frequency of past depression than those reporting mild allergic symptoms).

Hypothesis 17: There will be a positive relationship between the severity of allergic symptoms and shyness (i.e., individuals reporting moderate or severe allergic symptoms will report higher levels of shyness than those reporting mild allergic symptoms).

Analysis: To investigate the relationships between the severity of allergic symptoms and current depression and

shyness one way analyses of variance were performed (table 17 and 19). To determine if a significant relationship exists between the severity of allergic symptoms and a history of depression correlations were calculated (table 18).

Table 17

Analysis of Variance Comparing the Severity of Allergic Symptoms and Current Depression

Source	df	SS	MS	F	Fprob
Between Groups	2	135.80	67.90	1.03	0.36
Within Groups	158	10372.00	65.65		
Total	160	10507.80			

Table 18

Correlation Coefficients for the Variables Severity of Asthma, Severity of Eczema, Severity of Hay Fever, Severity of Hives, Severity of Allergic Rhinitis, and History of Depression

	HISTORY OF DEPRESSION
SEVERITY OF ASTHMA	-.07
SEVERITY OF ECZEMA	-.17
SEVERITY OF HAY FEVER	-.02
SEVERITY OF HIVES	.08
SEVERITY OF RHINITIS	-.38

* p = <.05

Table 19

Analysis of Variance Comparing the Severity of Allergic Symptoms and Shyness

Source	df	SS	MS	F	Fprob
Between Groups	2	12.89	6.45	0.05	0.95
Within Groups	156	21446.77	137.48		
Total	158	21459.66			

Conclusion: As observed in tables 17 and 18, there is no significant difference between the severity of allergic symptoms and current or past depression, hypothesis 16 is therefore rejected. Subjects reporting moderate or severe allergic symptoms do not have higher levels of current depression or a greater frequency of a history of depression than subjects reporting mild allergic symptoms.

As evident in table 19, there is no significant difference between the severity of allergic symptoms and shyness. Subjects reporting moderate or severe allergic symptoms do not have higher levels of shyness than subjects reporting mild allergic symptoms. Consequently, hypothesis 17 is rejected.

Hypothesis 18 and 19

Hypothesis 18: There will be a significant relationship between the age of onset of allergies and levels of depression. Specifically, subjects who report the onset of allergies between the ages of 28 and 35 years will report higher levels of depression than those who report onset at other ages.

Hypothesis 19: There will be a significant relationship between the age of onset of allergies and levels of shyness. Specifically, subjects who report the onset of allergies between the ages of 28 and 35 years will report higher levels of shyness than those who report onset at other ages.

Analysis: As only two subjects reported the onset of allergies between the ages of 28 and 35, it was not possible to perform statistical calculations as a consequence of the severe skew in the number of subjects reporting the onset of allergies between the ages of 0 and 16. Consequently, these hypotheses were left untested.

Table 20

Summary of Hypotheses Tested and Outcome

HYPOTHESIS	OUTCOME
1	Supported
2	Rejected
3	Supported
4	Supported
5	Rejected
6	Rejected
7	Rejected
8	Supported
9	Rejected
10	Supported
11	Rejected
12	Supported
13	Rejected
14	Supported
15	Rejected
16	Rejected
17	Rejected
18	Not Tested
19	Not Tested

V. DISCUSSION

The results of the present study indicate that a relationship between allergies and depression exists (see table 20, hypothesis 1). Specifically, it was found that the allergies asthma and hives, but not eczema, hay fever, or perennial allergic rhinitis are associated with higher levels of depression. Also relevant was a relationship between shyness and depression indicating that higher levels of shyness are associated with higher levels of depression (see table 20, hypothesis 4). Contrary to the expected findings however, there was no indication that an association exists between any allergic disorder and shyness (see table 20, hypothesis 2).

Of the 386 participants in this study (254 females, 132 males; mean age 24.36, SD = 5.18), 167 or 43.3% reported having one or more allergic disorder. While this is considerably higher than the proportion of allergic subjects (i.e., 20%) reported by Matussek et al. (1983), it is consistent with the evidence that educational level is associated with greater prevalence of allergy (i.e., 45% in higher and 31% in lower socio-economic groups) (Bell et al., 1991). The mean age of onset of all allergies combined was 11.12. The overall mean score on the depression inventory was 7.11 (SD = 5.18) which according to Beck and Steer (1993) falls within the minimal range. The number of subjects reporting a history of depression was 35 or 9.1%. The sample

mean for the measure of shyness was 46.05 (SD = 11.97) which is slightly below the reported mean of 49.40 for a combined norm group of men and women (Jones & Briggs, 1986).

The most significant association between allergies and current depression was for subjects reporting asthma followed by subjects reporting hives. However, only those subjects with hives also reported a significantly higher frequency of a history of depression. This lends some support to the view that individuals with allergies are more prone to depression than individuals without allergies (Bell et al, 1991; Gauci et al, 1993; Matussek et al, 1983). However, while Bell et al. found that subjects with a clinical history of depression reported a higher prevalence of allergies, this relationship was only significant for subjects reporting hay fever and asthma allergies, which is partially consistent with results of the present study. The inconsistencies between these results may possibly suggest that the psychological experience of being depressed may bring about immunological dysfunction that precipitates in the nonspecific formation of any of the Type I allergic disorders.

A significant relationship between allergies and, in particular, hay fever allergies (as hypothesised) and shyness was not observed. Contrariwise, hay fever allergies had the most negative, although insignificant correlation with shyness scores when compared to the remaining four allergies. This is in contrast to earlier work by Bell et al. (1990) who

found that the extremely shy young adults had a higher prevalence of hay fever allergies (but not other types of allergies) than extremely outgoing individuals and Gauci et al. (1993) who reported that allergic subjects had higher Social Introversion scores on the MMPI than non allergic subjects. As a result, the present research does not support the position that extreme shyness may be a stable, temperamental trait of individuals who have a biological predisposition to nasal allergies (Bell et al). Instead, the results of the current study suggest the need for caution when interpreting the results reported by Bell et al. and Gauci et al. Due to the fact that the current study did not reveal any significant correlations between allergic disorder and shyness, depression and allergic disorder appear to be more consistently (i.e., when compared to previous research) and more highly correlated than shyness and allergic disorder.

The association between shyness and depression is also another important relationship. The results of the present study indicated that higher levels of shyness were positively correlated with higher levels of current as well as a professional diagnosis (history) of depression. This finding is consistent with findings by Bell et al. (1990) who reported that social introversion in adults and behaviourial inhibition in children were related to increased levels of depression and Gauci et al. (1993) who reported that high

Social Introversion scores were associated with high Depression scores on the MMPI. High shyness scores in individuals who also have high depression scores may possibly be attributed to feelings of withdrawal and social isolation that frequently accompany the depressive state. It may also be that biologically acquired shyness results in fear of social situations, eventual loneliness, and ultimately, depression. Additionally, when higher levels of shyness were combined with allergic disorder as a single variable, they were not associated with higher levels of depression than were allergic disorder and lower levels of shyness. Shyness then, in combination with allergic disorder does not appear to have any apparent effect on the prevalence of depression. This is consistent with other results of the present study indicating that shyness and allergic disorder are unrelated.

The present study also investigated the relationships between the number of allergies as well as the number of allergens to which an individual was allergic and levels of depression and shyness. It was determined that a significant positive relationship exists between the number of allergies reported and levels of current and past depression. This finding is inconsistent however, with findings reported by Bell et al. (1991) who found that the number of allergies was not associated with a greater frequency of depression. While the relationship between the number of allergies and depression may be an epiphenomenon, high depression scores in

individuals reporting multiple allergies may possibly suggest that the chronic stress induced by multiple allergies may result in immunological overload that gives rise to depressive states.

With regards to the association between the number of allergens to which an individual was allergic and levels of depression, the present study, as hypothesised, failed to find any significant relationship. This finding is consistent with findings reported by Bell et al. (1991) who reported that the number of environmental allergens was not associated with a greater frequency of depression but is inconsistent with the finding that the number of air-borne substances to which an individual is allergic is associated with higher levels of depression (Gauci et al., 1993).

The present study also failed to find significant relationships between the number of allergies and allergens reported and levels of shyness. This finding casts doubt on previous findings by Bell et al. (1990) who reported that high shyness scores were positively correlated with the number of allergies and allergens reported by subjects and Gauci et al (1993) who reported that the number of allergens was associated with higher Social Introversion scores on the MMPI.

The present study also investigated the influence of gender on levels of depression and shyness as well as the number of allergies reported. It was determined that females

do not report higher levels of depression than males as previously indicated by Correll (1984), Funabiki et al. (1980), Krause (1986), and many others. This finding is consistent however, with a few studies (e.g., Dobson, 1985; Golding, 1988) that failed to find gender differences in depression. While it is generally accepted that females are more at risk for depression than males, the lack of this finding in the present research may be related to the fact that all participants were university students who were equally subjected to the stress and undoubtedly for some, the depression that a university environment may bring.

With respect to gender differences in shyness, the present study did not reveal any significant differences between males and females. This finding is consistent with findings by Bell et al. (1993), Foley et al. (1986), and Kamath and Kanekar (1993) who also reported no gender differences in levels of shyness.

Consistent with findings reported by Matussek et al. (1983) and Bell et al.(1991) that the frequency of allergic disorder is significantly higher for women, the present study found a significant relationship between gender and the number of allergies reported indicating that females report more allergic disorders than males. This finding is inconsistent however, with findings by Wiley and Goldstein (1991) and Barbee et al.(1976) who reported that the frequency of allergies among males is equal to the frequency

among females. Previous and current findings that indicate a higher frequency of allergies in females may possibly be related to the fact that females seek out medical attention more readily than males (Briscoe, 1987) and therefore may have had their allergies confirmed.

The effect of age on the variables depression, shyness, and number of allergies was also explored in the present study. Results indicated that although there was no relationship between age and current levels of depression, younger subjects reported a greater frequency of a history of depression than older subjects. While there is little consensus regarding the relationship between depression and age in the literature, these findings are consistent with Barnes et al. (1988) who reported that symptoms of depression were most common in younger and lower in older participants of their study. In the present study, the younger, more depressed subjects may have had greater difficulty adjusting to changes in academic environments or perhaps geographical location (and separation from their families) that are for some, an inherent part of higher education.

Regarding the relationship between age and levels of shyness, the present study failed to find any significant differences. This finding is consistent with the view that shyness is a life-long, stable, and enduring trait and therefore has no specific correlates with age (Crozier & Burnham, 1990).

With respect to the relationship between age and the number of allergies reported, results of the present study suggest that no significant differences exist between the different age groups. This finding is in conflict with findings by Barbee et al. (1976) who claimed that subjects between the ages of 30 and 35 had the highest frequency of allergic reactivity.

The association between the severity of allergic symptoms and depression and shyness was also the subject of investigation. It was reasoned that individuals who reported moderate or severe allergic symptoms would also report higher levels of shyness and depression. Although these hypotheses were not supported the results are consistent with Teiramaa (1978b) who reported that affective disorders lack a definitive association with the severity of asthma. In the present study, the severity of allergic symptoms was based upon subject self-reports which may possibly have resulted in considerable intersubject variation in the rating of similar allergic symptoms. A more accurate method of assessing the severity of allergic symptoms would be to base severity on skin reactivity tests and clinical diagnoses.

To summarise the results of the present study, there was a significant relationship between the allergies asthma and hives and current depression. Only hives however, was associated with a history of depression. While a strong association existed between shyness and depression, shyness

was not associated with any allergic disorder, including hay fever. The relationship between allergic disorder and depression was stronger than the association between shyness and allergic disorder. Allergic disorder and higher levels of shyness were not associated with higher levels of depression than were allergic disorder and average or lower levels of shyness. A positive relationship was found between the number of allergies and current and past depression. There was no significant relationship between the number of allergies and shyness levels or the number of allergens to which an individual was allergic and levels of depression and shyness. No age nor gender differences were observed in levels of current depression and shyness although females reported more allergic disorders than males. An age relation was found for a history of depression with younger subjects reporting a greater frequency of past depression than older subjects. There was no apparent relationship between the severity of allergic symptoms and levels of depression and shyness.

Limitations

Several limitations to the present study exist. First, all participants in the study were recruited from a single educational institution and are therefore not representative of the general population. Respondents in the present study were chosen on the basis that educational level was

associated with a greater frequency of allergic disorder (Bell et al., 1991) and because general observation of the researcher lead her to believe that the number of mature students pursuing educational degrees was significant (i.e., 32.7% of the sample were aged between 25 and 55 years). Consequently, this group would probably include many previously full-time employed students and/or part-time students who were also concurrently employed which would provide a sample more representative of the general community. However, it is also generally accepted that certain characteristics such as intelligence and motivation exist to a greater degree in a university population and this could set them apart from the community at large. Consequently, it would be prudent to use caution when generalising results of the present study to the general public.

Regarding the age of the participants in this study, the sample was positively skewed resulting in a disproportionate number of students in the youngest age category. Two-thirds of the sample fell in the 19-24 age category while only one-tenth of the sample were aged over 31 years. Furthermore, the oldest subject in the sample was only 55 years and therefore middle aged individuals were not effectively represented. Similarly, older individuals were not represented at all in this study. It is possible that older subjects (i.e., > 55 years) differ in many ways from younger subjects and that

these differences may not have been evident due to the lack of older subjects represented in the total sample. Consequently, results of the present study should not be generalised to this particular age group.

With respect to the gender of the participants, the sample was also disproportionately skewed with two-thirds of the sample being female. This suggests that results may be more confidently generalised to females as a group than they can be to males as a group. A more equal representation of males and females would assist in identifying any significant differences between the two groups.

Another limitation of the present study relates to the unequal representation of the different subtypes of allergic disorders within the sample. As a result, the direct comparison of the various types of allergies and their relation to depression and shyness casts doubt on the validity of the results to some degree. The decision to compare the different proportions of allergic disorders in the present study was based solely on the fact that comparing individuals who equally represented the different types of allergic disorders would have required such a large sample size that it would have exceeded the limits of this study.

The final limitation of this study relates to the way in which the psychological constructs were assessed. All data collection was based upon subject self-reports. In order to provide valid and reliable results, this method of collecting

data requires that subjects provide honest and accurate responses to the questionnaires. Although it is assumed that being university students, all participants in the study were intelligent and that this may have assisted in above-average interpretation of and response to the questionnaires, it is also possible that students' perceptions of their internal states may have differed radically providing either falsely elevated or depressed results.

Delimitations

The present study was delimited with respect to all participants being selected from a particular faculty within the same university setting. In fact, all participants in the present study were registered in various sessions of the same course. Although it is recognised that college students are not entirely representative of the general population, the decision to restrict the present study to include only students registered in the faculty of education was based solely on the limited amount of funding available for this project.

Implications

The aim of the present study was to provide a more complete and thorough understanding of the interaction between allergic disorders and certain personality

constructs. An increased understanding of the relationships among allergies, depression, and shyness can alert counsellors and physicians to the associations among these variables so that they may give other areas necessary attention. For example, knowing that there is a significant relationship between shyness and depression, and that symptoms of depression may include social withdrawal and low self-esteem, counsellors may first wish to work with the issues related to depression before suggesting that the client enrol in group therapy for the cognitive-behaviourial management of shyness. In addition, consideration of the relationships between age and gender and allergies, depression, and shyness may help identify certain groups at risk so that preventative measures can be implemented. For example, in this study it was determined that younger subjects more frequently reported being depressed than older subjects. As a common symptom of depression is increased cognitive difficulty, younger students prone to depression will be more inclined to have greater difficulty concentrating on their course work which could impede academic performance and hinder achievement. With this in mind, university counsellors may work with their clients to alleviate some of the symptoms of depression and if deemed necessary, refer students to their physicians so that antidepressant medication may be prescribed. This last point is also important in light of the fact that depression and

allergic disorder appear to be positively correlated and that previous reports (e.g., Nasr & Atkins, 1977; Preston, 1969) indicate concurrent improvement of allergic symptoms in individuals treated pharmacologically for depression.

The results of the present study may also have implications for parents and teachers. For example, if teachers and parents are cognizant of the relationships among allergies, depression, and shyness they will be better able to observe their students and/or children and implement assessment and intervention techniques before the emergence of clinical states. This action may possibly alleviate any deficits in social and/or academic performance that may be related to compromised emotional and/or physical health existing in individuals vulnerable to allergies, depression, and shyness.

Future Research

The findings of the present research point to several research directions for the future. First, it would prove beneficial to replicate the present study with a group of individuals more representative of the general community to determine if the results are replicable. For example, a sample that includes more middle-aged and older subjects would help determine if any significant differences exist among the different age groups. Similarly, a sample

consisting of an equal proportion of males and females would help identify any existing gender differences. In addition, equal representation of the different types of allergies in each group would also permit a more direct and valid comparison of existing relationships. Furthermore, clinical assessment of allergies, depression, and shyness through the use of interviews and medical testing in combination with standardised questionnaires may provide a more accurate indication of the presence and severity of these variables. As the present study is an exploration of correlational relationships and does not attempt to determine causality, further research could examine whether the relationships determined are a cause, effect, or concomitant of each other. While medical treatment of depression has been found to result in less severe allergic symptoms (Nasr & Atkins, 1977; Preston, 1969) it would be useful to investigate whether medical treatment of allergies results in lower levels of depression. This may help determine the direction of the relationship. Finally, longitudinal studies may assist in determining the stability of the psychophysiological status of the individual throughout the lifespan as well as help identify if the improvements in depression and allergic symptoms as a consequence of medical treatment are consistent. This work may suggest new areas of exploration into the possible causes of affective disorders in individuals with specific subtypes of allergic disorders.

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APPENDIX A

Allergic Disorder Inventory

Thankyou for your participation in this project. To assist in determining the relationship between certain personality, demographic, and medical variables, please complete the following questionnaire. As you are not required to identify yourself in any way your responses will be completely anonymous.

1. Gender: Male _____ Female _____

2. Age: _____

3. Have you ever been professionally diagnosed with depression?

   YES _____

   NO _____

4. Do you suffer from:

   Asthma _____

   Eczema _____

   Hives _____

   Seasonal allergic rhinitis (Hay fever) _____

   Perennial allergic rhinitis _____

If you answered **NO** to **ALL** of the above (in question 4) you have completed this questionnaire. If you answered **YES** to **ANY** of the above, please answer questions 5 through 8. Thankyou.

5. Have your allergies been confirmed by medical skin prick tests?

YES _____

NO _____

N/A _____

6. Please check the specific allergens/irritants to which you are allergic:

Heat _____

Cold _____

Dust _____

Mould _____

Pollens _____

Foods _____

Chemicals _____

Other _____

7. Please rate the severity of your allergic symptoms (i.e., as mild, moderate, or severe) **WITHOUT** the use of medication:

Asthma _____

Eczema _____

Hives _____

Seasonal allergic rhinitis (Hay fever) _____

Perennial allergic rhinitis _____

8. How old were you when you first suffered from:

Asthma _____

Eczema _____

Hives _____

Seasonal allergic rhinitis (Hay fever) _____

Perennial allergic rhinitis _____